

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of

ACTON et al

Serial No. 10/014,795

Filed: December 14, 2001

For: REDUCTION IN MINERAL SALT DEPOSITION



Atty. Ref.: 3948-4

TC/A.U.: 1754

Examiner: Kuhar, Anthony J.

2004 AUG 10 PM 2:39

August 5, 2004

Mail Stop 16  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

**REQUEST FOR REFUND**

A refund is respectfully requested for the overpayment made with the filing of a Notice of Appeal, an Amendment and a Petition to Extend, filed on July 21, 2004 (copy enclosed). When the Notice of Appeal, Amendment and Petition to Extend were filed, applicant's attorney inadvertently listed "\$1,280.00 as the basic filing fees of this patent application, when in fact the correct amount is "\$640.00" for a small entity. Therefore it is requested that the overpayment of \$640.00 be refunded to applicant's undersigned attorney by crediting \$640.00 to our deposit account no. 14-1140 under Order No. 3948-4. For this purpose a duplicate copy of this paper is enclosed.

Respectfully submitted,

**NIXON & VANDERHYTE P.C.**

By: \_\_\_\_\_

  
Leonard C. Mitchard  
Reg. No. 29,009

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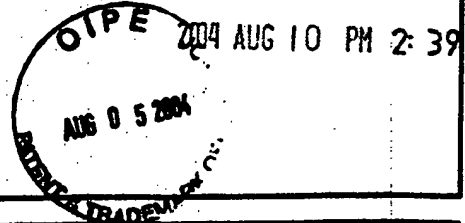

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In the following listed application(s) or patent(s):

Patent Number (if appropriate)	Application Number	Patent Date (if appropriate)	U.S. Filing Date
	10/014,795		December 14, 2001

Typed or Printed Name	Leonard C. Mitchard	(check one)  <input type="checkbox"/> Applicant or Patentee  <input type="checkbox"/> Assignee of record of the entire interest. Statement under 37 C.F.R. § 3.73(b) is enclosed. (Form PTO/SB/96)  <input checked="" type="checkbox"/> Attorney or Agent of record  29,009 (Reg. No.)
Signature		
Date	July 21, 2004	
Address of signer:	1100 North Glebe Road, 8 <sup>th</sup> Floor Arlington, VA 22202	

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below.

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
Before the Board of Patent Appeals and Interferences

In re Patent Application of

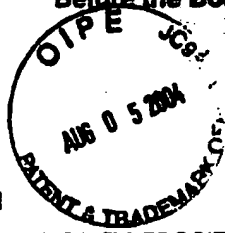
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Examiner: Kuhar, Anthony J.

Date: July 21, 2004

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☒ Correspondence Address Indication Form Attached.

☒ **NOTICE OF APPEAL**

Applicant hereby appeals to the Board of Patent Appeals and Interferences from the last decision of the Examiner. (\$ 330.00 )

\$ 330.00

☐ An appeal BRIEF is attached in triplicate in the pending appeal of the above-identified application (\$ 330.00)

\$

☐ Credit for fees paid in prior appeal without decision on merits

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☐ A reply brief is attached in triplicate under Rule 193(b)

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\$ 950.00

**SUBTOTAL \$ 1280.00**

☐ Applicant claims "Small entity" status, enter 1/2 of subtotal and subtract

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☐ "Small entity" statement attached.

**SUBTOTAL \$ 1280.00**

Less month extension previously paid on

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**TOTAL FEE ENCLOSED \$ 1280.00**

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NIXON & VANDERHYTE P.C.

By Atty: Leonard C. Mitchell, Reg. No. 29,009

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In re Patent Application of

Atty Dkt. 3948-4

C# M#

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ACTON et al

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1754

Serial No. 10/014,795

Examiner: Kuhar, Anthony J.

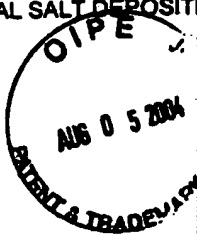
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Sir:

**RESPONSE/AMENDMENT/LETTER**

This is a response/amendment/letter in the above-identified application and includes an attachment which is hereby incorporated by reference and the signature below serves as the signature to the attachment in the absence of any other signature thereon.

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Fees are attached as calculated below:

Total effective claims after amendment	17	minus highest number			
previously paid for	24 (at least 20) =	0 x	\$ 18.00	\$	0.00
Independent claims after amendment	0	minus highest number			
previously paid for	3 (at least 3) =	0 x	\$ 86.00	\$	0.00
If proper multiple dependent claims now added for first time, add \$290.00 (ignore improper)				\$	0.00
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Terminal disclaimer enclosed, add \$ 110.00				\$	0.00
<input type="checkbox"/> First/second submission after Final Rejection pursuant to 37 CFR 1.129(a) (\$770.00)				\$	0.00
<input type="checkbox"/> Please enter the previously unentered, filed					
<input type="checkbox"/> Submission attached					
				Subtotal \$	950.00

If "small entity," then enter half (1/2) of subtotal and subtract

☐ Applicant claims "small entity" status. ☐ Statement filed herewith

Rule 56 Information Disclosure Statement Filing Fee (\$180.00)

Assignment Recording Fee (\$40.00)

Other: Notice of Appeal

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NIXON & VANDERHYE P.C.

By Atty: Leonard C. Mitchard, Reg. No. 29,009

Signature: \_\_\_\_\_

**COPY**

**AMENDMENTS TO THE CLAIMS:**

2004 AUG 10 PM 2: 39

This listing of claims will replace all prior versions, and listings, of claims in the application:

1-7 (cancelled).

8 (currently amended). A method of reducing deposition of mineral salts from an aqueous supersaturated solution onto a solid surface in contact with the aqueous supersaturated solution which method consists essentially of:

(a) forming a composition comprising a dispersion of either (i) seed crystals of the mineral salt in an aqueous solution of the mineral salt or (ii) seed crystals of a salt isomorphous with the mineral salt in an aqueous solution of the isomorphous salt wherein the dispersed seed crystals are of mean particle size of less than 2.5 microns and have been obtained via generation of cavitation in an aqueous supersaturated solution of the mineral salt or a salt isomorphous with the mineral salt;

(b) distributing said composition into either (i) an aqueous supersaturated solution of the mineral salt or (ii) an aqueous precursor liquid of the aqueous supersaturated solution which aqueous precursor liquid is saturated with respect to the seeds, and in the case of (b)(ii) converting the aqueous precursor liquid into an aqueous supersaturated solution of the mineral salt; and by (i) cooling and/or reducing the pressure of the aqueous precursor liquid or (ii) by adding a complementary iron to the precursor liquid; and;

(c) contacting the aqueous supersaturated solution with the solid surface.

9 (original). A method as claimed in Claim 8 wherein the composition is obtained by subjecting an aqueous supersaturated solution of either (i) the mineral salt or (ii) a salt isomorphous with the mineral salt to sonic or ultrasonic vibration.

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10 (original). A method as claimed in Claim 9 wherein the seed crystals have 0.025 – 0.5 times the diameter of crystals of the same mineral salt which crystallise out from an aqueous supersaturated solution thereof in the absence of sonic or ultrasonic vibration.

11 (previously presented). A method as claimed in claim 9 wherein the frequency of the ultrasonic vibration is between 16 and 40kHz.

12 (original). A method as claimed in Claim 11 wherein the energy density applied to the aqueous supersaturated solution by the ultrasonic vibration is in the range of from 1 to 100 J/cm<sup>3</sup>.

13 (previously presented). A method as claimed in claim 9 wherein the duration of the applied ultrasonic vibration is 0.05 to 360 seconds.

14 (previously presented). A method as claimed in claim 9 wherein the degree of supersaturation of the aqueous supersaturated solution which is subjected to the ultrasonic vibration is 50 to 400 times over the saturation level.

15 (previously presented). A method as claimed in claim 9 wherein the supersaturated solution which is subjected to the ultrasonic vibration is obtained by passing 2 or more aqueous solutions of the separate components of the mineral salt or of the separate components of the isomorphous salt to a locus of mixing, at which locus the aqueous supersaturated solution is formed and the ultrasonic vibration is applied. 2004 AUG 10 PM 2:39

16 (previously presented). A method as claimed in claim 8 wherein the percentage weight of seed crystals from the dispersion to the total weight of seed crystals and depositable mineral salts is in the range 10 to 50% w/w.

17 (currently amended). A method as claimed in claim 8 wherein distribution of the composition into the aqueous ~~supersaturated solution or aqueous precursor liquid~~ is performed 2 to 4 times with the distribution being in series or parallel or a combination of both.

18-24 (cancelled).

25 (previously presented). A method as claimed in Claim 8 wherein the mineral salt is selected from the group consisting of alkaline earth metal carbonates and alkaline earth metal sulphates.

26 (previously presented). A method as claimed in Claim 8 wherein the seed crystals are of Mean particle size of 0.5 to 2 microns.

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2004 AUG 10 PM

27 (previously presented). A method as claimed in Claim 8 wherein the seed crystals are present in the dispersion in an amount of from 1 to 60% by weight based on the total weight of dispersion.

28 (previously presented). A method as claimed in Claim 8 wherein the seed crystals are barium sulphate crystals and have 3 dimensional distances of length, breadth and thickness, normal to one another, in a ratio of 0.4-1.5:1:0.4-1.5.

29 (previously presented). A method as claimed in Claim 8 wherein the seed crystals have one or more voids therein which voids occupy 5 to 40% of the volume enclosed by the envelope of the outer surface of the seed crystals.

30 (previously presented). A method as claimed in Claim 8 wherein the seed crystals are rounded calcium carbonate crystals having a diameter in the range of 1 to 2.5 microns.

31 (cancelled).

32 (previously presented). A method as claimed in Claim 8 further comprising the step of monitoring the size of the crystals.



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**REMARKS/ARGUMENTS**

Reconsideration of this application is requested. Claims 8-17, 25-30 and 32 are in the case.

**I. THE OBVIOUSNESS REJECTIONS**

Claims 8-16, 18, 25-29 and 32 stand rejected under 35 U.S.C. §103(a) as allegedly unpatentable over EP 0196,622 in view of Gatumel et al. That rejection is respectfully traversed.

As now claimed, the method of the invention is for reducing deposition of mineral salts from an aqueous supersaturated solution onto a solid surface in contact with the aqueous supersaturated solution. The method consists essentially of the steps of (a) forming a composition comprising a dispersion of either (i) seed crystals of the mineral salt in an aqueous solution of the mineral salt or (ii) seed crystals of a salt isomorphous with the mineral salt in an aqueous solution of the isomorphous salt wherein the dispersed seed crystals are of mean particle size of less than 2.5 microns and have been obtained via generation of cavitation in an aqueous supersaturated solution of the mineral salt or a salt isomorphous with the mineral salt; (b) distributing the composition into an aqueous precursor liquid of the aqueous supersaturated solution which aqueous precursor liquid is saturated with respect to the seeds, and converting the aqueous precursor liquid into an aqueous supersaturated solution of the mineral salt by (i) cooling and/or reducing the pressure of the aqueous precursor liquid or (ii) by adding a complementary iron to the precursor liquid; and; (c) contacting the aqueous supersaturated solution with the solid surface.

2004 AUG 10 PM 2: 39  
A method of distributing a composition of seed crystals into an aqueous precursor liquid (which is not supersaturated) is not described or suggested by EP 916622, when taken alone or in combination with Gatumel. EP 916622 discloses addition of a scale formation preventer (such as particles of calcium sulphate) to a composition which is already in a supersaturated condition. Thus, it can be seen from reference to Figure 1 and the Examples that the complementary ions, e.g. calcium and sulphate, are fed from tanks A and B into tank D where a supersaturated solution is formed (see page 5, lines 22-23). Calcium sulphate particles are then added into this supersaturated solution from tank C.

It has been found according to the present invention that with more highly reactive systems such as those comprising barium and sulphate ions, the method described in EP 916622 would not be very suitable and would still lead to a large amount of mineral salt deposition. This is because with highly reactive ions such as barium and sulphate, when these are mixed in the absence of seed crystals, spontaneous nucleation would occur very rapidly. Crystallisation (and therefore unwanted deposition of mineral salt) would occur within seconds, and this could not be prevented by the subsequent addition of seed crystals to the supersaturated solution (as occurs in EP 916622). This phenomenon is critical, particularly in the oil industry where high levels of supersaturation are encountered, and where barium and sulphate ions are routinely present. The method of EP 916622 would not be suitable or efficient enough under these conditions.

By contrast, in accordance with the amended claims presented herewith, in the present method the seed crystals are added to a precursor solution which is not

supersaturated with respect to either of the reactive ions. Only thereafter is it allowed to mix downstream with a solution of complementary ions which will then lead to a condition of supersaturation. However, because the seed crystals are already present, deposition of mineral salt from the supersaturated solution is minimised. The additional features of converting the precursor liquid into a supersaturated solution by cooling and/or reducing the pressure of the aqueous precursor liquid or by adding a complimentary ion into the precursor liquid (both of these are after addition of seed crystals) are likewise not disclosed or suggested by EP 916622. Thus, there would have been no motivation for the skilled person to modify EP 916622 to arrive at the presently claimed method because the method of EP 916622 works satisfactorily in the field for which it is described, name paper-making. It would, therefore, not have been obvious to one of ordinary skill based on EP 916622 that a substantial improvement in the reduction of deposition of mineral salts could be obtained in fields such as the oil industry by employing the presently claimed process.

Gatumel does cure the deficiencies of EP 916622 in regard to the presently claimed invention. Gatumel is relied upon for an alleged disclosure relating to nucleation process for producing barium sulfate crystals using ultrasonic vibrations. Other than this, Gatumel is not relevant to the invention as claimed and does not give rise to a *prima facie* case of obviousness, either when taken alone or in combination with EP 916622.

In light of the above, it is clear that one of ordinary skill in the art would not have been motivated to arrive at the presently claimed invention based on the combined disclosures of the prior art relied on by the Examiner. Absent any such motivation, it is

clear that a *prima facie* case of obviousness has not been generated in this case.

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Reconsideration and withdrawal of the outstanding obviousness rejection of claims 8-16, 18, 25-29 and 32 are accordingly respectfully requested.

Claim 17 stands rejected under 35 U.S.C. §103(a) as allegedly unpatentable over EP '622 in view of Gatumel et al and further in view of Baumgard '966. This rejection is respectfully traversed.

Claim 17 has been amended to specify distribution of the composition into the aqueous precursor liquid being performed 2 to 4 times with the distribution being in series or parallel or a combination of both. The combined disclosures of EP '622 and Gatumel et al do not suggest claim 17 (which is dependent on claim 8) for the above discussed reasons. Baumgard does not cure the deficiencies of the two primary references relied upon to reject claim 17. The art relied upon does not suggest distribution of the composition into the aqueous precursor liquid being performed 2 to 4 times with the distribution being a series or parallel or a combination of both. Withdrawal of the outstanding rejection of claim 17 is accordingly respectfully requested.

## II. ALLOWABLE SUBJECT MATTER

It is noted, with appreciation, that claim 30 is free of the prior art. Based on the amendments and arguments presented above, it is believed that all of the claims in this application are now in condition for allowance. Early notice to that effect is respectfully requested.

Favorable action on the application is awaited.

ACTON et al  
Appl. No. 10/014,795  
July 21, 2004

PATENT MAINTENANCE  
DIVISION

Respectfully submitted,

2004 AUG 10 PM 2:40

NIXON & VANDERHYE P.C.

By: \_\_\_\_\_

**COPY**

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☐ An appeal **BRIEF** is attached in triplicate in the pending appeal of the above-identified application (\$ 330.00)

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☐ Credit for fees paid in prior appeal without decision on merits

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**SUBTOTAL** \$ 1280.00

☐ Applicant claims "Small entity" status, enter 1/2 of subtotal and subtract

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☐ "Small entity" statement attached.

**SUBTOTAL** \$ 1280.00

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**TOTAL FEE ENCLOSED** \$ 1280.00

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NIXON & VANDERHYTE P.C.  
By Atty: Leonard C. Mitchard, Reg. No. 29,009

Signature: 

07/20/2004 JBALINAN 00000057-10014795

01-FC:1401 -330.00-OP

Adjustment date: 09/14/2004 EEKUBAY1  
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01 FC:2401 165.00 OP



**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Patent Application of

ACTON et al

Atty. Ref.: 3948-4; Confirmation No. 4355

Appl. No. 10/014,795

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Examiner: Kuhar, Anthony J.

For: REDUCTION IN MINERAL SALT DEPOSITION

\* \* \* \* \*

July 21, 2004

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

**AMENDMENT**

In response to the Official Action mailed January 21, 2004 (for which petition is hereby made for a three-month extension of time), please amend the above-identified application as follows:

~~07/20/2004 JBALINAN 00000057-10014795~~

~~02 FC:1253~~

~~950.00 OP~~

~~Adjustment date: 09/14/2004 EEKUBAY1~~

~~07/20/2004 JBALINAN 00000057 10014795~~

~~02 FC:1253~~

~~-950.00 OP~~

09/14/2004 EEKUBAY1 00000012 10014795

02 FC:2253

475.00 OP

Repln. Ref: 09/14/2004 EEKUBAY1 0010122800

DAH:141140 Name/Number:10014795

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